

REMARKS/ARGUMENTS

The Examiner rejects claims 1-9, 12-13, 15, 22-24, 26-34, 37-38, 40, 47-50, 51-59, 62-63, 65, and 72-75 under 35 U.S.C. §103(a) as being unpatentable over U.S. 5,092,155 to Rounbehler et al. in view of U.S. 5,751,897 to Van Alstyne; claims 10-11, 14, 35-36, 39, 60-61, and 64 under 35 U.S.C. §103(a) as being unpatentable over Rounbehler et al. in view of Van Alstyne and further in view of U.S. 6,477,907 to Chambers et al. and U.S. 5,942,699 to Ornath et al.; and claims 16-21, 41-46, and 66-71 under 35 U.S.C. §103(a) as being unpatentable over Rounbehler et al. in view of Van Alstyne and further in view of U.S. 6,558,626 to Aker et al.

Applicant respectfully traverses the Examiner's rejection. The cited patents fail to teach or suggest at least the following italicized features in the rejected independent claims:

1. A method for detecting a high boiling point and/or a low vapor pressure material, comprising:

directing radiation from a radiation source onto a surface potentially comprising a high boiling point and/or low vapor pressure material, *wherein, during a time interval of no more than about 1/100th seconds, the directed radiation has a cumulative energy of at least about 1,200 Joules;*

collecting an airborne sample at and/or near the surface, *wherein the airborne sample comprises at least a portion of any high boiling point and/or low vapor pressure material on the surface;* and

detecting whether or not the high boiling point and/or low vapor pressure material is present in the collected sample.

26. A system for detecting a high boiling point and/or a low vapor pressure material, comprising:

a radiation source operable to direct radiation onto a surface potentially comprising a high boiling point and/or low vapor pressure material, *wherein, during a time interval of no more than about 1/100th seconds, the directed radiation has a cumulative energy of at least about 1,200 Joules to inhibit pyrolyzation of the material;*

a sample handling system operable to collect an airborne sample at and/or near the surface; and

a detector operable to detect whether or not the high boiling point and/or low vapor pressure material is present in the collected sample.

51. A system for detecting a high boiling point and/or a low vapor pressure material, comprising:

radiation emitting means for emitting radiation onto a surface potentially comprising a high boiling point and/or low vapor pressure target material, *wherein, during a time interval of no more than about 1/100th seconds, the directed radiation has a cumulative energy of at least about 1,200 Joules, whereby the cumulative energy at least one of (a) increases a vapor pressure of the target material, (b) displaces small particles from the surface, at least some of the small particles carrying the target material, and (c) volatilizes a non-target substance, the volatilized non-target substance displacing the target material;*

a sample handling means for collecting an airborne sample at and/or near the surface; and

a detector means for detecting whether or not the high boiling point and/or low vapor pressure material is present in the collected sample.

The present invention is directed to the use of a strobe to cause the capture of low vapor pressure and/or high boiling point materials. The energy imparted to the target surface causes the otherwise undetectable materials to become airborne for capture by a sample handling system for transport to a detector. While not wishing to be bound by any theory, the possible mechanisms for capturing the materials include one or more of (a) thermally increasing the vapor pressure of the target material; (b) thermally volatilizing the target material; (c) thermally displacing small particles from the sample area which carry the target material; and (d) thermally volatilizing a non-target substance, such as water, with the resulting vapor entraining the target material.

Rounbehler et al.

Rounbehler et al. is directed to a detection system for detecting vapors of specific compounds in air. Vapors emanating from the compounds, such as explosives, or stripped from surfaces using heat and suction from a hand-held gun are collected on surfaces coated with gas chromatograph (GC) material. The GC material traps explosive vapors but repels nitric oxide. The explosive materials from the trapped vapors are then desorbed and concentrated in one or more cold spot concentrators. A high speed gas chromatograph separates the vapors, after which specific vapors are decomposed in two pyrolyzers and the resulting nitric oxide detected. The heat source for the detector system is a lamp 132, which includes four gold-plated projection bulbs. The lamps are activated for a brief time interval, such as 0.2 seconds, near an object to be sampled to cause an increase in the vapor pressure of explosives. Other suitable heat sources include hot air jets, high speed flash lamps (whose very rapid heating may avoid loss of heating by conduction by a metal surface), irons which heat by direct contact, and microwave devices. (Col. 9, lines 17-22.)

Van Alstyne

Van Alstyne is directed to a decontamination system that uses a xenon flash lamp operated with a pulse repetition rate of between about 0.1 pulses/second and 12 pulses/second, an energy pulse duration of about 400 to about 800 μ s, and a peak energy per pulse exceeding about 3,750 Joules. Van Alstyne teaches the removal of PCBs and nuclear material and coatings, such as paint, by *carbonizing* (or reducing to ash) the contaminant. (Col. 3, lines 25-37.)

Although referring to “high speed flash lamps”, Rounbehler et al. does not teach or suggest the use of a radiation source having a cumulative energy of at least about 200 Joules over a time period of no more than about 1/100th seconds. It is not clear from Rounbehler et al. whether the nitrogen-containing compounds, such as explosives, are vaporized in their original form or, during irradiation, are at least partially pyrolyzed into component nitramines and nitrate esters. It is therefore not clear, particularly in view of the teachings of Van Alstyne, that a xenon flash lamp would heat high boiling point and/or low vapor pressure materials to a temperature sufficient to volatilize *but not pyrolyze* the contaminant materials. If the contaminant materials are pyrolyzed, they are not themselves present to be detected. Their detection would require detection of the pyrolyzed byproducts. As will be appreciated, the pyrolyzed byproducts may come from sources other than the target contaminant materials. Pyrolyzation during sample collection can thus adversely impact the accuracy of the detection device.

The remaining references fail to overcome this deficiency of Rounbehler et al. and Van Alstyne.

Chambers et al.

Chambers et al. is directed to an apparatus and method for detecting explosive-indicating compounds in subsurface soil. The apparatus has a probe with an adsorbent material on some portion of its surface that can be placed into soil beneath the ground surface, where the adsorbent material can absorb at least one explosive-indicating compound. The apparatus additionally has the capability to desorb the explosive-indicating compound through heating or solvent extraction. A

diagnostic instrument attached to the probe detects the desorbed compound. The sampling probe with the adsorbent material on the probe surface is inserted into the soil to contact the adsorbent material with the soil. The compounds are, after adsorption, then desorbed and transferred as either a liquid or gas sample to the diagnostic tool for analysis.

Ornath et al.

Ornath et al. is directed to a method for collectively sampling a number of cargo items for contaminants such as chemical residues. The items are placed in a generally airtight chamber and agitated physically to release particulates and vapors from the surfaces and interiors of the items. The physical agitation methods include vibrating the items and pressurizing the depressurizing the chamber by introducing bursts of high pressure air into the chamber and directing jets of high pressure air at the cargo. The high pressure air may be heated or mixed with solvent vapors. The physical agitation drives particulates and vapors of contaminants into suspension in the air in the chamber. Air withdrawn during depressurization is passed through a collection system to collect the particulates and vapors for subsequent analysis.

Aker et al.

Aker et al. is directed to a detector for detecting vapors emitted from energetic compounds that includes a housing, a pump, and a sensing assembly. The housing has an inlet, an outlet, and an enclosed sensing volume positioned therebetween. The pump communicates with the housing for moving a carrier gas sequentially through the enclosed sensing volume at a predetermined flow rate. The sensing assembly senses the vapors of the energetic compound delivered by the carrier gas

as the carrier gas passes through the housing. The sensing assembly includes a sensing unit constructed of an amplifying fluorescent polymer, a source of excitation, a light detector, and a converter assembly.

Accordingly, the pending claims are allowable over the cited references.

The dependent claims provide further reasons for allowance.

By way of example, dependent claims 10, 11, 35, 36, 60 and 61 are directed to the application of a volatilizing agent to the surface to be irradiated. The Examiner cites Ornath et al. for the obviousness of this feature. Applicant's disagree. Ornath et al. teaches the use of physical agitation and high pressure air mixed with solvent vapors to dislodge physically target materials from the surface being tested. It therefore teaches away from the vaporization of the target materials by vaporizing a liquid applied to the surface to be tested.

Dependent claims 13-14, 38-39, and 63-64 are directed to the use of an outputted energy profile having a peak located in a radiation absorption band of the material or volatilization agent. The Examiner states that "choosing an energy level where the peak of the profile is located in a radiation absorption band of the material is an obvious choice." The Examiner has failed to provide the required prior art support for this statement. *In re Lee*, Fed. Cir., No. 00-1158, 1/18/02) (an obviousness determination may not substitute the "common knowledge" of one skilled in the art for specific evidence that prior art suggests an invalidating combination of references).

Dependent claims 16-20, 41-45, and 66-71 comprise a number of features of the conduit for collecting a sample. For example, the conduit must be heated (claim 16, 41, and 66), to a

temperature that is at least the condensation temperature of the material (claims 17, 42, and 67), comprises a glass and/or ceramic surface adjacent to the transported sample (claims 19, 44, and 69), comprises a silanizing agent (claims 20, 45, and 70), and comprises a substantially nonpolar surface adjacent to the transported sample (claims 21, 46, and 71). These features inhibit the material from collecting on the conduit and therefore an inaccurate measurement. Aker et al. teaches away from the present invention. Aker et al., unlike the present invention, teaches absorbing the material in the collected airborne sample on the walls of the capillary or conduit in an absorption/desorption zone. This is effected by coating the capillary walls with a fluorescent polymer that is heated to prevent moisture condensation and actively stabilize the response of the polymer inside against temperature variations caused by ingestion of air samples at varying temperatures. The accuracy of the temperature setting is less important than the thermal stability of the amplifying fluorescent polymer. (Col. 7, lines 6-40.) Analytes “will have a slight binding interaction with the surface of the absorption/desorption zone 40 of the capillary 13 through a combination of dispersion forces and/or polar intermolecular forces, and as the analyte encounters the wall 34 of the absorption/desorption zone 40 of the capillary 13, it is *absorbed* into the wall 34 of the capillary 13 or into the coating of the absorption/desorption zone 40 of the capillary 13.” (Col. 7, lines 53-60 (emphasis supplied)). Accordingly, unlike the present invention Aker et al. teaches that the material to be detected is to be absorbed, during sample collection, onto the wall of the capillary or conduit.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation

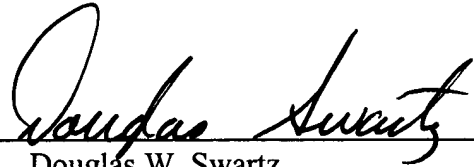
*Application No. 10/719,8401
Reply to Office Action of Jun. 7, 2004
Amendment dated Sep. 7, 2004*

would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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Date: Sept. 7, 2004